SHORT QUESTIONS

Q.1- Define Percentage. Also give example.

Ans. The word " Percent " means out of hundred or per hundred. The symbol for percentage is % .

Example:

Ahmad takes a test and gets 14 marks out of 20. Find the marks percentage?

Solution:- Marks obtained = 14

$$\text{Marks percentage} = \frac{14}{20} \times 100\%$$
$$= 14 \times 5\%$$
$$= 70\%$$

Q.2- How do a percentage and fraction can be interconverted?

Ans. Percentage is converted into fraction by dividing it by 100. Let us consider

$$20\% = \frac{20}{100} = \frac{1}{5}$$

$$50\% = \frac{50}{100} = \frac{1}{2}$$

Similarly common fraction is converted to percentage by multiplying it by 100

Example:

$$\frac{3}{5}=\frac{3}{5}\times 100\% = 60\%$$

$$\frac{16}{25}=\frac{16}{25}\times 100\% = 64\%$$

Q.3- If $\frac{4}{5}$ of the students in a school have been away for a holiday. How many out of every hundred have been on holiday?

Solution:-

$$\frac{4}{5}=\frac{4}{5}\times 100\% = 80\%$$

Thus *80* students out of every *100* have been on holiday.

Q.4- If 56 % of the homes in a colony have a car. What % age of homes do not have a car?

Solution:-

Total number of homes in the colony = *100 %*
Number of homes having cars = *56 %*
Number of homes having no car = *100 % − 56 %*
= *44 %*

Q.5- Explain the term "ratio" also give an example.

Ans. Ratio is a comparison of two or more like quantities measured in like units. The symbol for ratio is ":". If a and b represent two magnitudes of a quantity where b is not zero then ratio of a to b is written as $a : b$ or $\frac{a}{b}$.

Q.6- Define Antecedent and Consequent in a ratio.

Ans. In a ratio "$a : b$" the first quantity 'a' is called antecedent and the 2nd quantity 'b' is called consequent.

Q.7- In what ratio $60\,m^2$ be decreased to $24\,m^2$?

Solution:-

Required ratio $= 24:60$

$= 2:5$

Q.8- There are 1029 students in a school. 504 of them are girls. Find the ratio of boys to the girls.

Solution:-

Total number of student $= 1029$

Number of girls $= 504$

Number of boys $= 1029 - 504$

$= 525$

Required ratio = Number of boys : Number of girls

$= 525:504$

$= 175:168$

$= 25:24$ Ans.

Q.9- Define proportion.

Ans. The equalities of two ratios is called proportion.

Example:

$3:5$ and $9:15$ are equal ratios. So we can write

$3:5 :: 9:15$

Q.10- Find the value of 'x' if x : 3 : : 60 : 15

Solution:- We have

$x:3::60:15$

$$\frac{x}{3} = \frac{60}{15}$$

$$x = \frac{60 \times 3}{15} = 12$$

Q.11- What are the types of proportions?

Ans. There are three kinds of proportions

(i) Direct proportion *(ii)* Inverse proportion.

(iii) Compound proportion.

Q.12- Define "Direct proportion"

Ans. The quantitative relationship between two quantities such that increase in one quanitity causes a proportional increase in the other quantity, is called direct proportion.

Q.13- Define "Inverse proportion"

Ans. The quantitative relationship between two quantities such that increase in one quantity causes a proportional decrease in the other quantity or decrease in one quantity causes a proportional increase in the other quantity, is called inverse proportion.

Q.14- What do you know about compound proportion?

Ans. When one quantity is proportional to more than one quantities either direct or inverse, then the proportion is called compound proportion.

SOLVED EXERCISES

EXERCISE 1.1

Q.1- Express the following percentages as fractions in their lowest form.

(i) 95% *(ii)* 65% *(iii)* 75% *(iv)* 25% *(v)* 56%

(vi) 48% *(vii)* 8% *(viii)* $33\frac{1}{2}\%$ *(ix)* $37\frac{1}{2}\%$

(x) $87\frac{1}{2}\%$ *(xi)* $5\frac{1}{4}\%$ *(xii)* $42\frac{1}{4}\%$

Solution:-

(i) $95\% = \frac{95}{100} = \frac{5\times19}{5\times20} = \frac{19}{20}$ Ans.

(ii) $65\% = \frac{65}{100} = \frac{5\times13}{5\times20} = \frac{13}{20}$ Ans.

(iii) $75\% = \frac{75}{100} = \frac{3\times25}{4\times25} = \frac{3}{4}$ Ans.

(iv) $25\% = \frac{25}{100} = \frac{25\times 1}{25\times 4} = \frac{1}{4}$ Ans.

(v) $56\% = \frac{56}{100} = \frac{14\times 4}{25\times 4} = \frac{14}{25}$ Ans.

(vi) $48\% = \frac{48}{100} = \frac{12\times 4}{25\times 4} = \frac{12}{25}$ Ans.

(vii) $8\% = \frac{8}{100} = \frac{2\times 4}{25\times 4} = \frac{2}{25}$ Ans.

(viii) $33\frac{1}{2}\% = \frac{67}{2}\% = \frac{67}{2\times 100} = \frac{67}{200}$ Ans.

(ix) $37\frac{1}{2}\% = \frac{75}{2}\% = \frac{75}{2\times 100} = \frac{3\times 25}{2\times 4\times 25} = \frac{3}{8}$ Ans.

(x) $87\frac{1}{2}\% = \frac{175}{2}\% = \frac{175}{2\times 100} = \frac{25\times 7}{2\times 4\times 25} = \frac{7}{8} = \frac{7}{8}$ Ans.

(xi) $5\frac{1}{4}\% = \frac{21}{4}\% = \frac{21}{4\times 100} = \frac{21}{400}$ Ans.

(xii) $42\frac{1}{2}\% = \frac{85}{2}\% = \frac{85}{2\times 100} = \frac{17\times 5}{2\times 20\times 5} = \frac{17}{40}$ Ans.

Q.2- Express the following fractions as percentage, giving your answer correct to 1 decimal place, where necessary.

(i) $\frac{3}{4}$ **(ii)** $\frac{3}{5}$ **(iii)** $\frac{4}{25}$ **(iv)** $\frac{13}{20}$ **(v)** $\frac{31}{25}$ **(vi)** $\frac{21}{40}$

(vii) $\frac{23}{60}$ **(viii)** $\frac{8}{3}$ **(ix)** $\frac{8}{5}$ **(x)** $\frac{7}{8}$ **(xi)** $\frac{5}{8}$ **(xii)** $\frac{3}{8}$

Solution:-

(i) $\frac{3}{4} = \frac{3}{4}\times 100\% = \frac{3\times 25\times 4}{4}\% = 75\%$ Ans.

(ii) $\frac{3}{5} = \frac{3}{5}\times 100\% = \frac{3\times 20\times 5}{5}\% = 60\%$ Ans.

(iii) $\frac{4}{25}=\frac{4}{25}\times 100\%=\frac{4\times 4\times 25}{25}\%=16\%$ Ans.

(iv) $\frac{13}{20}=\frac{13}{20}\times 100\%=65\%$ Ans.

(v) $\frac{31}{25}=\frac{31}{25}\times 100\%=124\%$ Ans.

(vi) $\frac{21}{40}=\frac{21}{40}\times 100\%=\frac{105}{2}\%=52.5\%$ Ans.

(vii) $\frac{23}{60}=\frac{23}{60}\times 100\%=\frac{115}{3}\%=38\frac{1}{3}\%$ Ans.

(viii) $\frac{8}{3}=\frac{8}{3}\times 100\%=\frac{800}{3}\%=266.66\%$ Ans.

(ix) $\frac{8}{5}=\frac{8}{5}\times 100\%=160\%$ Ans.

(x) $\frac{7}{8}=\frac{7}{8}\times 100\%=\frac{175}{2}\%=87.5\%$ Ans.

(xi) $\frac{5}{8}=\frac{5}{8}\times 100\%=\frac{125}{2}\%=62.5\%$ Ans.

(xii) $\frac{3}{8}=\frac{3}{8}\times 100\%=\frac{75}{2}\%\ \ 37.5\%$ Ans.

Q.3- Express the following fractions as percentage, give your answer correct to 3 places of decimal.

(i) 47% (ii) 58% (iii) 92% (iv) 8% (v) 12%

(vi) 120% (vii) 180% (viii) 145% (ix) $5\frac{1}{2}\%$

(x) $5\frac{1}{3}\%$ (xi) $48\frac{2}{3}\%$ (xii) $58\frac{1}{3}\%$

Solution:-

(i) $47\%=\frac{47}{100}=0.47$ Ans

(ii) $58\%=\frac{58}{100}=0.58$ Ans

(iii) $92\% = \frac{92}{100} = 0.92$ Ans

(iv) $8\% = \frac{8}{100} = 0.08$ Ans

(v) $12\% = \frac{12}{100} = 0.12$ Ans

(vi) $120\% = \frac{120}{100} = 1.20$ Ans

(vii) $180\% = \frac{180}{100} = 1.80$ Ans

(viii) $145\% = \frac{145}{100} = 1.45$ Ans

(ix) $5\frac{1}{2}\% = 5.5\% = \frac{5.5}{100} = 0.055$ Ans

(x) $5\frac{1}{3}\% = 5.33\% = \frac{5.33}{100} = 0.0533$ Ans

(xi) $48\frac{2}{3}\% = 48.67\% = \frac{48.67}{100} = 0.4867$ Ans

(xii) $58\frac{1}{3}\% = 58.33\% = \frac{58.33}{100} = 0.5833$ Ans

Q.4- Express the following decimals as percentages.
(i) 0.5 (ii) 0.9 (iii) 1.25 (iv) 1.39 (v) 1.72 (vi) 0.22 (vii) 2.64 (viii) 3.41 (ix) 0.845 (x) 1.78 (xi) 1.58 (xii) 0.065

Solution:-

(i) $0.5 = 0.5 \times 100\% = 50\%$ Ans

(ii) $0.9 = 0.9 \times 100\% = \frac{9}{10} \times 100\% = 90\%$ Ans

(iii) $1.25 = 1.25 \times 100\% = \frac{125}{10} \times 100\% = 125\%$ Ans

(iv) $1.39 = 1.39 \times 100\% = \frac{139}{100} \times 100\% = 139\%$ Ans

(v) $1.72 = 1.72 \times 100\% = \dfrac{172}{100} \times 100\% = 172\%$ Ans

(vi) $0.22 = 0.22 \times 100\% = \dfrac{22}{100} \times 100\% = 22\%$ Ans

(vii) $2.64 = 2.64 \times 100\% = \dfrac{264}{100} \times 100\% = 264\%$ Ans

(viii) $3.41 = 3.41 \times 100\% = \dfrac{341}{100} \times 100\% = 341\%$ Ans

(ix) $0.845 = 0.845 \times 100\% = \dfrac{845}{1000} \times 100\% = \dfrac{845}{10}\%$

$= 84.5\%$ Ans

(x) $1.78 = 1.78 \times 100\% = \dfrac{178}{100} \times 100\% = 178\%$ Ans

(xi) $1.58 = 1.58 \times 100\% = \dfrac{158}{100} \times 100\% = 158\%$ Ans

(xii) $0.065 = 0.065 \times 100\% = \dfrac{65}{1000} \times 100\%$

$= \dfrac{65}{10}\% = 6.5\%$ Ans

Q.5- Complete the following table:

	Fraction	Percentage	Decimal
1.	$\frac{3}{4}$	$\frac{3}{4} \times 100\% = 75\%$	$\frac{75}{100} = 0.75$
2.	$\frac{4}{5}$	$\frac{4}{5} \times 100\% = 80\%$	$\frac{80}{100} = 0.80$
3.	$\frac{40}{100} = \frac{2}{5}$	40%	$\frac{40}{100} = 0.40$
4.	$\frac{62}{100} = \frac{31}{50}$	$\frac{62}{100} = 62\%$	0.62
5.	$\frac{44}{100} = \frac{11}{25}$	44%	0.44

EXERCISE 1.2

Q.1- If 45% of the students in a school are girls. What percentage are boys?

Solution:-

All the students in the school = *100 %*

Girls students = *45 %*

Boys students = *100 %* − *45 %* = *55 %* Ans.

Q.2- If 82% of the houses have a television, what percentage does not have?

Solution:- Number of houses = *100 %*

Number of having T.V = *82 %*

Number of having no T.V = *100 %* − *82 %*

= *18 %* Ans.

Q.3- A hockey team won 62% of their matches and 26% of them were ended in a draw. What percentage of the matches they lost?

Solution:-

Number of matches played = *100 %*

Number of matches won = *62 %*

Number of matches ended in a draw = *26 %*

Number of matches lost = *100 %* − *62 %* − *26 %*

= *12 % Ans.*

Q.4- An aeroplane carries 400 passengers, 52% of the passengers were Pakistani, 17% were Chinese, 12% were from Iran and the rest were from British.

(i) **How many people of each nationality were on the plane?**

(ii) **What percentage were British?**

Solution:-

(i) Total number of passengers = *400*

Pakistani passengers = *52 %* = *52% of 400*

$$\frac{52}{100} \times 400 = 208 \text{ Passengers Ans.}$$

Chinese passengers = 17% of 400

$$= \frac{17}{100} \times 400 = 68 \text{ Passengers Ans.}$$

Passengers from Iran = 12% of 400

$$= \frac{12}{100} \times 400 = 48 \text{ Passengers Ans.}$$

Remaining British were = $400 - 208 - 68 - 48$

$= 76$ Passengers Ans.

$$\text{Percentage of British} = \frac{76}{400} \times 100 = 19\%$$

Q.5- Amna scored 46 out of 50 in a Math test, 64 out of 75 in a Chemistry test and 72 out of 80 in a Physics test. In which subject did she perform best?

Solution:-

$$\%\text{ age of scores in math} = \frac{46}{50} \times 100 = 92\%$$

$$\%\text{ age of scores in Chemistry} = \frac{64}{75} \times 100 = 85.3\%$$

$$\%\text{ age of scores in Physics} = \frac{72}{80} \times 100 = 90\%$$

Thus the greatest percentage is 92% in Math. So Amna performed the best in Maths. Ans.

Q.6- A table costs a carpenter Rs. 720 to make. He sells it for Rs. 920. What percentage of profit does he earn?

Solution:-

C. P = Rs 720

S. P = Rs 920

Profit = Rs 920 – Rs 720 = Rs 200

$$\%\text{ age of Profit} = \frac{\text{Profit.}}{\text{C.P}} \times 100$$

$$= \frac{200}{720} \times 100 = \frac{250}{9} = 27.78\ \%\ \text{Ans.}$$

Q.7- If 8.4 % of a book consists of 42 pages. Find total number of pages in the book?

Solution:-

8.4 % of book contains number of pages = 42

So, $\frac{8.4}{100}$ of book contains number of pages = 42

$$\text{Total number of pages in book} = 42 \times \frac{100}{8.4}$$

$$= \frac{42 \times 1000}{84} = 500\ \text{Pages Ans.}$$

Q.8- Out of his total income, Hamza spends 20% on house rent and 70% of the rest on household expenditures. If he saves Rs. 1800, What is his total income?

Solution:-

Let x rupees be the total income

Rent = 20 % of x

Rest of the income = 80 % of x

$$= \frac{80}{100} \times x = \frac{4x}{5}$$

Expenditure on house hold = 70 % of $\frac{4x}{5}$

Saving = 30 % of $\frac{4x}{5}$

Thus according to the given condition.

$$30\ \%\ \text{of}\ \frac{4x}{5} = 1800$$

$$\frac{30}{100} \times \frac{4x}{5} = 1800$$

$$x = \frac{1800 \times 100 \times 5}{30 \times 4} = 7500$$

$x =$ Rs. 7500 Ans.

Q.9- Raheel's income is 25 % more than that of Rauf. What percent is Rauf's income less than Raheel's?

Solution:- Let us suppose

Rauf's income = Rs. 100

Then Raheels income = Rs. 125

% age of difference age w.r.t Raheels income.

$$= \frac{\text{Difference.}}{\text{Raheel's income}} \times 100$$

$$= \frac{25}{125} \times 100 = 20\% \text{ Ans.}$$

EXERCISE 1.3

Q.1- Find the ratio of first quantity to the second in its lowest terms.

***(i)* Rs. 24, Rs. 6 *(ii)* 20 kg, 5kg *(iii)* 20cm, 80 cm**

***(iv)* 5m, 5m *(v)* 1500 km, 1200 km**

***(vi)* Rs. 150, Rs. 275**

Solution:-

(i) $Rs.\ 24 : Rs.\ 6 = 24 : 6 = \frac{24}{6} = \frac{4}{1} = 4 : 1$ Ans.

(ii) $20\ kg : 5\ kg = 20 : 5 = \frac{20}{5} = \frac{4}{1} = 4 : 1$ Ans.

(iii) $20cm, 80\ cm = 20 : 80 = \frac{20}{80} = \frac{1}{4} = 1 : 4$ Ans.

(iv) $5m, 5m = 5 : 5\ \frac{5}{5} = \frac{1}{1} = 1 : 1$ Ans.

(v) $1500\ km, 1200\ km = \frac{1500}{1200} = \frac{5}{4} = 5 : 4$ Ans.

(vi) Rs. 150, Rs. 275 $= \frac{150}{275} = \frac{6}{11} = 6 : 11$ Ans.

Q.2- Express each of the following ratios in its simplest form.

(i) $\frac{2}{3} : \frac{3}{5}$ (ii) $\frac{4}{5} : \frac{3}{4}$ (iii) $\frac{5}{6} : \frac{7}{10}$

(iv) $\frac{13}{40} : \frac{3}{20}$ (v) $\frac{2}{3} : \frac{1}{6}$ (vi) $\frac{4}{10} : 20$

(vii) $\frac{15}{10} : 2$ (viii) $\frac{12}{10} : \frac{28}{10}$ (ix) $\frac{2}{5} : \frac{1}{3}$

Solution:-

(i) $\frac{2}{3} : \frac{3}{5} = 15 \times \frac{2}{3} : \frac{3}{5} \times 15$ (Multiply by L.C.M = 15)

$= 10 : 9$ Ans.

(ii) $\frac{4}{5} : \frac{3}{4}$

$= 20 \times \frac{4}{5} : \frac{3}{4} \times 20$ (Multiply by L.C.M = 20)

$= 16 : 15$ Ans.

(iii) $\frac{5}{6} : \frac{7}{10}$

$= 30 \times \frac{5}{6} : \frac{7}{10} \times 30$ (Multiply by L.C.M = 30)

$= 25 : 21$ Ans.

(iv) $\frac{13}{40} : \frac{3}{20}$

$= 40 \times \frac{13}{40} : \frac{3}{20} \times 40$ (Multiply by L.C.M = 40)

$= 13 : 6$ Ans.

(v) $\frac{2}{3} : \frac{1}{6}$

$= 6 \times \frac{2}{3} : \frac{1}{6} \times 6$ (Multiply by L.C.M = 6) $= 4 : 1$ Ans.

(vi) $\frac{4}{10} : 20$

$= \frac{2}{5} : \frac{20}{1} = 2 : 100$ (Multiply by L.C.M = 5)

$= 1 : 50$ Ans.

(vii) $\frac{15}{10} : 2$

$= \frac{3}{2} : \frac{2}{1}$ (Multiply by L.C.M = 2) $= 3 : 4$ Ans.

(viii) $\frac{12}{10} : \frac{28}{10}$ (Multiply by L.C.M = 10)

$= 12 : 28 \quad = 3 : 7$ Ans.

(ix) $\frac{2}{5} : \frac{1}{3}$

$= 15 \times \frac{2}{5} : 15 \times \frac{1}{3}$ (Multiply by L.C.M = 15)

$= 6 : 5$ Ans.

Q.3- In a city 126 medical students traveled by:

Rikshaw	Taxi	Bus	Car
14	9	75	28

Find ratio of the students who used.

(i) Rikshaw to taxi (ii) Taxi to bus

(iii) Taxi to car.

Solution:-

(i) Rikshaw : Taxi

14 : 9 Ans.

(ii) Taxi : Bus

9 : 75 Ans.

3 : 25

(iii) Taxi : Car

9 : 28 Ans.

Q.4- **In a school library, there are 75 books on Mathematics, 115 on English, 85 on Chemistry and 60 on Physics. Find ratio of the following:**

- ***(i)*** **Mathematics books to English books.**
- ***(ii)*** **English books to Chemistry books.**
- ***(iii)*** **English books to Physics books.**
- ***(iv)*** **Physics books to Chemistry books.**
- ***(v)*** **Physics books to Mathematics books.**
- ***(vi)*** **Chemistry books to Mathematics books.**

Solution:-

(i)	Math Books	:	Eng Books	
	75	:	115	
	15	:	23	(Divided by 5)
(ii)	Eng Books	:	Chemistry Books	
	115	:	85	
	23	:	17	(Divided by 5)
(iii)	Eng Books	:	Physics Books	
	115	:	60	
	23	:	12	(Divided by 5)
(iv)	Physics Books	:	Chemistry Books	
	60	:	85	
	12	:	17	(Divided by 5)
(v)	Physics Books	:	Math Books	
	60	:	75	
	4	:	5	(Divided by 5)
(vi)	Chemistry Books	:	Math Books	
	85	:	75	
	17	:	15	(Divided by 5)

EXERCISE 1.4

Q.1- Find the ratio of 6 rupees each to 72 rupees per dozen.

Solution:-

6 Rupees each : *72* Rupees per dozen

= *72* Rupees per dozen : *72* Rupees per dozen

= *1* : *1* Ans.

Note :- *6* rupees each means *72* rupees per dozen.

Q.2- Find the ratio of Rs. 160 per meter to Rs. 150 per meter.

Solution:- Rs. *160* per meter : Rs. *150* per meter

= *160* : *150*

= *16* : *15* Ans.

Q.3- Find the ratio of Rs. 72 for 24 to rupees 4 each?

Solution:-

Rs. *72* for *24* : Rs. *4* each

= Rs. *3* each : Rs. *4* each

= *3* : *4* Ans.

Note :- Rs. *72* for *24* means Rs. *3* each.

Q.4- A square 'A' has side 2 cm and a square 'B' has side 6cm. Find ratio of:

(i) The length of the side of the square 'A' to the length of the side of the square 'B'.

(ii) The perimeter of the square 'A' to the perimeter of the square 'B'.

(iii) The area of the square 'A' to the area of the square 'B'.

Solution:-

(i) Length of side of A : Length of side of B

2 cm : *6* cm

= *2* : *6*

= *1* : *3* Ans.

(ii) Perimeter of A : Perimeter of B

4×2 cm : 4×6 cm

$=8$: 24

$=1$: 3 Ans.

(iii) Area of A : Area of B

$(2\,cm)^2$: $(6\,cm)^2$

$=4$: 36

$=1$: 9 Ans.

Q.5- If a : b = 2 : 3, find the ratio 6a : 2b.

Solution:-

$a : b = 2 : 3$

$=\frac{a}{b} = \frac{2}{3}$

Multiply by $\frac{6}{2}$ on both sides.

$=\frac{6a}{2b}=\frac{6\times2}{2\times3}=\frac{2}{1}$

$6a : 2b = 2 : 1$ Ans.

Q.6- A triangle has sides of lengths 3cm , 4cm and 6cm. Find the ratio of the lengths of the sides to one another.

Solution:-

Let the length of three sides of triangle be named as a, b, c

So

(i) $a : b = 3cm : 4cm$

$= 3 : 4$ Ans.

(ii) $b : c = 4cm : 6cm$

$= 2 : 3$ Ans.

(iii) $c : a = 6cm : 3cm$

$= 2 : 1$ Ans.

Q.7- Two angles in a triangle are 54^0 and 72^0. Find the ratio of the third angle to the sum of the first two?

Solution:-

Let $\alpha = 54^0$, $\beta = 72^0$

and the third angle $\gamma = ?$

We know that

Sum of measure of three angles of a triangle is 180^0 so

$\alpha + \beta + \gamma = 180^0$

$\gamma = 180^0 - \alpha - \beta$

$\gamma = 180^0 - 54^0 - 72^0$

$= 54^0$

Now

$\gamma : \alpha + \beta$

$54^0 : 72^0 + 54^0$

$= 54^0 : 126^0$

$= 3 : 7$ Ans.

Q.8- Ali's father earns a salary of Rs. 40,000 in a month, while his father's monthly expenditures are Rs. 35,000. Find the ratio of his father's:

(i) Income to expenditure

(ii) Expenditure to savings

(iii) Income to savings

Solution:-

Salary = Rs $40,000$

Expenditure = Rs $35,000$

Saving = Rs $40,000$ − Rs $35,000$

= Rs 5000

Now, required ratio's are

(i) Income : Expenditure = $40,000 : 35,000$ $= 8 : 7$ Ans.

(ii) Expenditure : Saving = $35,000 : 5,000$ $= 7 : 1$ Ans.

(iii) Income : Saving = $40,000 : 5,000$ $= 8 : 1$ Ans.

Q.9- **A square A has side 6cm and square B has side 8cm.**

Find the ratio of:

(i) **The length of the side of a square A to the length of the side of the square B.**

(ii) **The area of square A to the area of square B**

Solution:-

Length of the side of square A = $6cm$

Area of the square A $=(6cm)^2 = 36cm^2$

Length of the side of square B = $8cm$

Area of the square B $=(8cm)^2 = 64cm^2$

Required Ratios are

(i) Length of side of A : Length of side of B

$= 6cm : 8cm = 3 : 4$ Ans.

(ii) Area of A : Area of B

$= 36cm^2 : 64cm^2$

$= 9 : 16$ Ans.

Q.10- **A family has 12 pets of which 6 are cats, 2 are dogs and the rest are birds. Find the ratio of the number of:**

(i) **birds to dogs**

(ii) **birds to pets**

Solution:-

Number of pets = 12

Cats $= 6$

Dogs $= 2$

Birds $= 12 - 6 - 2 = 4$

Ratios are

(i) Birds : Dogs $= 4 : 2$

$= 2 : 1$ Ans.

(ii) Birds : Pets $= 4 : 12$

$= 1 : 3$ Ans.

EXERCISE 1.5

Q.1- Find the value of x in the proportion 20: 50 :: 8 : x?

Solution:-

$20 : 50 :: 8 : x$

$\Rightarrow \frac{20}{50} = \frac{8}{x}$

$\Rightarrow 20x = 8 \times 50$

$\Rightarrow x = \frac{8 \times 50}{20} = 20$ Ans.

Q.2- The price of 15 suits is Rs. 6750.How many such suits can be purchased by an amount of Rs 4050?

Solution:-

Let x suits can be purchased by an amount of Rs 4050.

Thus

Amounts	Suits
6750 ↓	15 ↓
4050	x

The proportion is direct , so

$6750 : 4050 :: 15 : x$

$\Rightarrow \frac{6750}{4050} = \frac{15}{x}$

$\Rightarrow 6750 \times x = 4050 \times 15$

$\Rightarrow x = \frac{4050 \times 15}{6750} = 9$ Suits. Ans.

Q.3- A motorcycle covers 90km in 2 liters of petrol. In how many liters of petrol will it cover 225km?

Solution:-

Let 225 km is covered in x liters of petrol . So

Distance (km) ,	Petrol (liters)
90 ↓	2 ↓
225	x

The proportion is direct . So

$90 : 225 :: 2 : x$

$\Rightarrow \frac{90}{225} = \frac{2}{x}$

$\Rightarrow 90 \times x = 225 \times 2$

$\Rightarrow x = \frac{225 \times 2}{90} = 5$ Liter Ans.

Q.4- A certain journey by train takes 5 hours at the speed of 45km/h. What will be the speed of the train to complete the same journey in 3 hours?

Solution:-

Let the speed by x km/h to complete the journey in 3 hours.

Thus	Time (hours)	Speed (km/h)
	↑ 5	↓ 45
	3	x

The proportion is inverse . So

$3 : 5 :: 45 : x$

$\Rightarrow \frac{3}{5} = \frac{45}{x}$

$\Rightarrow 3 \times x = 5 \times 45$

$\Rightarrow x = \frac{5 \times 45}{3} = 75\ km/h$ Ans.

Q.5- Six men can paint a house in four days. How long it would take to paint the house if three men are employed?

Solution:-

Men	Days
↑ 6	↓ 4
3	x

Here , the proportion is inverse. So

$3 : 6 \quad :: \quad 4 : x$

$$\Rightarrow \frac{3}{6} = \frac{4}{x}$$

$$\Rightarrow 3 \times x = 4 \times 6$$

$$\Rightarrow x = \frac{4 \times 6}{3} = 8$$

$= 8$ Days Ans.

Q.6- A manager plans to produce 100 bicycles with the help of 25 persons working 4 hours daily. How many bicycle can be made by 40 persons if they work 3 hours daily?

Solution:-

Let, he can make x bicycles. So

Persons	Daily hours	Bicycles
25 ↓	4 ↓	100 ↓
40	3	x

Both the proportions are direct.

So

$$\left.\begin{matrix} 25 : 40 \\ 4 : 3 \end{matrix}\right\} :: 100 : x$$

Product of extremes = Product of means

$$\Rightarrow 25 \times 4 \times x = 40 \times 3 \times 100$$

$$x = \frac{40 \times 3 \times 100}{25 \times 4} = 120 \text{ bicycles Ans.}$$

Q.7- A factory makes 560 fans in 7 days with the help of 20 machines. How many fans can be made in 12 days with the help of 18 machines ?

Solution:- Let x fans can be made. S.

Days	Machines	Fans
7 ↓	20 ↓	560 ↓
12	18	x

Both the proportions are direct.

$$\left.\begin{matrix} 7 & : 12 \\ 20 & : 18 \end{matrix}\right\} :: 560 : x$$

Product of extremes = Product of means

$$\Rightarrow 7\times 20\times x = 560\times 12\times 18$$

$$\Rightarrow x = \frac{560\times 12\times 18}{7\times 20} = 864 \text{ Fans Ans.}$$

Q.8- A factory makes 600 soaps in 9 days with the help of 20 machines. How many soaps can be made in 12 days with the help of 18 machines ?

Solution:-

Days	Machines	Soaps
9 ↓	20 ↓	600 ↓
12	18	x

Both the proportions are direct so

$$\left.\begin{matrix} 9 & : 12 \\ 20 & : 18 \end{matrix}\right\} :: 600 : x$$

Product of extremes = Product of means

$$\Rightarrow 9\times 20\times x = 12\times 18\times 600$$

$$\Rightarrow x = \frac{12\times 18\times 600}{9\times 20} = 720 \text{ Soaps Ans.}$$

Q.9- If the stay of 12men for 28 days in a hotel cost Rs6720. Find the cost for the stay of 7 men for 13 days.

Solution:-

Men	Days	Cost (Rs)
12 ↓	28 ↓	6720 ↓
8	14	x

Both the proportions are direct. So

$$\left.\begin{matrix} 12 & : 8 \\ 28 & : 14 \end{matrix}\right\} :: 6720 : x$$

Product of extremes = Product of means

$$\Rightarrow 12 \times 28 \times x = 8 \times 14 \times 6720$$

$$\Rightarrow x = \frac{8 \times 14 \times 6720}{12 \times 28} = 2240$$

= Rs. 2240. Ans

Q.10- If the stay of 14 men for 8 days in a hotel cost Rs. 22,400. Find the cost for the stay of 7 men for 13 days.

Solution:-

Men	Days	Cost (Rs)
14 ↓	8 ↓	22400 ↓
7	13	x

Both the proportions are direct. So

$$\left.\begin{array}{l} 14 : 7 \\ 8 : 13 \end{array}\right\} :: 22400 : x$$

Product of extremes = Product of means

$$\Rightarrow 14 \times 8 \times x = 22400 \times 7 \times 13$$

$$\Rightarrow x = \frac{22400 \times 7 \times 13}{14 \times 8}$$

$$\Rightarrow x = 18200$$

= Rs. 18200 Ans.

Q.11- 14 cows consume 63kg of hay in 18 days. How many cows will eat 770kg of hay in 28 days at the same rate?

Solution:-

Hay (kg)	Days	Cows
63 ↓	18 ↑	14 ↓
770	28	x

Hay and cows are directly proportional.

Days and cows are inversely proportional.

So

$$\left.\begin{matrix} 63:770 \\ 28:18 \end{matrix}\right\} :: 14 : x$$

Product of extremes = Product of means

$$\Rightarrow 63 \times 28 \times x = 14 \times 770 \times 18$$

$$\Rightarrow x = \frac{14 \times 770 \times 18}{63 \times 28} = 110 \text{ Cows Ans.}$$

Q.12- Juice manufacturer produce 3000 bottles in a day employing 15 workers working 8 hours. Find the number of bottles manufactured when he employs 18 workers working 6 hours.

Solution:-

Workers	Hours	Bottles
15 ↓	8 ↓	3000 ↓
18	6	x

Both the proportions are direct. So

$$\left.\begin{matrix} 15:18 \\ 8:6 \end{matrix}\right] :: 3000 : x$$

Product of extremes = Product of means

$$\Rightarrow 15 \times 8 \times x = 18 \times 6 \times 3000$$

$$\Rightarrow x = \frac{18 \times 6 \times 3000}{15 \times 8}$$

$$\Rightarrow x = 2700 \text{ Bottles. Ans.}$$

REVIEW EXERCISE :1

Q.3- Encircle the correct answer.

(i) 20 % of 600 is:

(a) 12 (b) 120

(c) 20 (d) 200

(ii) Fraction form of $70\ \%$ is:

(a) 7 (b) $\frac{7}{10}$

(c) $\frac{10}{7}$ (d) $\cdot 7$

(iii) $\frac{7}{20}$ in terms of percentage is:

(a) $35\ \%$ (b) 35

(c) 20 (d) $20\ \%$

(iv) $\frac{1}{3}$ in terms of percentage is:

(a) $2\ \%$ (b) $1\ \%$

(c) $33\ \%$ (d) $33\frac{1}{3}\%$

(v) 0.13 as percentage is:

(a) $\cdot 13$ (b) 30

(c) $13\ \%$ (d) $10\ \%$

(vi) In a ratio $a : b$, "a" is called:

(a) extreme (b) antecedent

(c) consequent (d) means

(vii) In a ratio $a : b$, "b" is called:

(a) extreme (b) means

(c) antecedent (d) consequent

(viii) In a proportion $a : b :: c : d$, a and d are called:

(a) extreme (b) means

(c) antecedent (d) consequent

(ix) In a proportion $a : b :: c : d$, b and c are called:

(a) means (b) extreme

(c) consequent (d) antecedent

(x) Lowest form of $75 : 95$ is:

(a) $15 : 17$ (b) $15 : 19$

(c) $19 : 15$ (d) $17 : 15$

Ans:

(i) *b*	*(ii)* *b*	*(iii)* *a*	*(iv)* *d*
(v) *c*	*(vi)* *b*	*(vii)* *d*	*(viii)* *a*
(ix) *a*	*(x)* *b*		

Q.2- Fill in the blanks.

(i) 30 % of 1500 is ________

(ii) Fraction form of 15 % is ________

(iii) $\frac{7}{25}$ in terms of percentage is ________

(iv) $\frac{2}{3}$ in terms of percentage is ________

(v) 0.29 as percentage is ________

(vi) In a ratio $a : b$ "a" is called ________

(vii) In a ratio $a : b$ "b" is called ________

(viii) In a proportion $a : b :: c : d$, a and d are called ________

(ix) In a proportion $a : b :: c : d$, the product of extremes is equal to the product of ________

(x) The simplest form of $\frac{2}{3} : \frac{3}{5}$ is ________

Ans:

(i) 450	*(ii)* $\frac{3}{20}$	*(iii)* 28 %	*(iv)* 66.67%
(v) 29 %	*(vi)* Antecedent	*(vii)* Consequent	*(viii)* Extremes
(ix) Means	*(x)* 10 : 9		

Q.3- A railway train carries 800 passengers, 55% passengers are men, 15% are children. What is the percentage of women?

Solution:-

Percentage of Men = 55 %

Percentage of Children = 15%

Percentage of Women = ?

Percentage of Women = 100% – % age of Men –% age of Children

$= 100\% - 55\% - 15\% = 30\%$

Women = 30% Ans.

Q.4- Azeem spends 25% of his income on house rent, 60% of the rest amount on household expenditure. If he saves Rs 2100, what is his total income?

Solution:-

Let x rupees be the total income.

House rent = 25% of x

Remain amount = 75% of x

$$= \frac{75}{100} \times x = \frac{3x}{4}$$

House hold expenditures = 60% of $\frac{3x}{4}$

He saves = 40% of $\frac{3x}{4}$

$$= \frac{40}{100} \times \frac{3x}{4} = \frac{3x}{10}$$

According to the given condition.

Saving $= \frac{3x}{10} =$ Rs. 2100

$$\Rightarrow x = \frac{2100 \times 10}{3} = 7000$$

$x =$ Rs. 7000

Total Income = 7000 Ans.

Q.5- In a school there are 220 student chairs, 110 student tables, 50 staff chairs and 30 staff tables. Find the ratio of the following

(i) **Students chairs to students tables.**

(ii) Students chairs to staff chairs.

(iii) Students tables to staff tables.

Solution:-

Students chairs = 220

Students tables = 110

Staff chairs = 50

Staff tables = 30

So

(i) Student chairs : students tables

$= 220 : 110 = 2 : 1$ Ans.

(ii) Student chairs : Staff chairs

$220 : 50$

$= 22 : 5$ Ans.

(iii) Students tables : Staff tables

$110 : 30$

$= 11 : 3$ Ans.

Q.6- Two angles in a triangle are 48° and 60°. find the ratio of the third angle to the sum of the first two angles.

Solution:-

Let x^0 be the measure of third and so we know

Sum of three angles of a triangle $= 180^0$

$\Rightarrow x^0 + 48^0 + 60^0 = 180^0$

$x^0 + 108^0 = 180^0$

$x^0 = 180^0 - 108^0 = 72^0$

Now required ratio is

Third angle : Sum of first two angles

$72^0 : 48^0 + 60^0 \Rightarrow 72 : 108$

$= 2 : 3$ Ans.

Q.7- 8 persons can do a job in 24 days, if 4 more persons join them, how much time they will take to complete the same job?

Solution:-

Persons	Days
8 ↑	24 ↓
12	x=?

The proportion is inverse. So

$$12:8::24:x$$

$$\Rightarrow \frac{12}{8} = \frac{24}{x}$$

$$\Rightarrow 12 \times x = 24 \times 8$$

$$\Rightarrow x = \frac{24 \times 8}{12} = 16$$ Days. Ans.

Q.8- The stay of 18 students for 36 days in a hostel costs Rs. 58320. Find the cost for the stay of 9 students for 12 days.

Solution:-

Students	Days	Cost (Rs)
18 ↓	36 ↓	58320 ↓
9	12	x=?

Both the proportions are direct

$$\left.\begin{matrix} 18:9 \\ 36:12 \end{matrix}\right] :: 58320 : x$$

Product of extremes = Product of means

$$18 \times 36 \times x = 9 \times 12 \times 58320$$

$$x = \frac{9 \times 12 \times 58320}{18 \times 36} = 9720$$

$x =$ Rs. 9720 *Ans.*

MULTIPLE CHOICE QUESTIONS

Q.1- Tick the correct answer.

(i) Percentage means

(a) Out of hundred *(b)* Per hundred

(c) $\frac{1}{100}$ times *(d)* All of these

Q.2- $45\frac{1}{2}\%$ is equal to

(a) $\frac{19}{20}$ *(b)* $\frac{21}{25}$ *(c)* $\frac{91}{200}$ *(d)* $\frac{39}{40}$

Q.3- $\frac{7}{5}$ is equal to

(a) $1\frac{2}{5}$ *(b)* 140 % *(c)* 1.40 *(d)* All of these

Q.4- 71 % of earth is water and the land is

(a) 35 % *(b)* 40 % *(c)* 29 % *(d)* 31 %

Q.5- 0.065 is equal to

(a) 65 % *(b)* $6\frac{1}{2}$ % *(c)* 650 % *(d)* 065 %

Q.6- 56 % of homes have a car then the homes having no cars are.

(a) 34 % *(b)* 44 % *(c)* 54 % *(d)* 60 %

Q.7- 8.4 % of a book consists of 42 pages. The total number of pages are.

(a) 300 *(b)* 400 *(c)* 500 *(d)* 600

Q.8- 40 books are increased in the ratio 5 : 4 The new number of books are

(a) 32 *(b)* 45 *(c)* 50 *(d)* 52

Q.9- The ratio 1500 : 1200 in its lowest terms is

(a) 15 : 12 *(b)* 1.5 : 1.2 *(c)* 5 : 4 *(d)* 3 : 4

Q.10- Out of 1029 students 504 are girls. The ratio of boys to number of girls is

(a) $1029 : 504$ (b) $504 : 1029$ (c) $504 : 525$ (d) $525 : 504$

Q.11- If a : b = 2 : 3 then 6a : 2b is equal to

(a) $2 : 1$ (b) $1 : 2$ (c) $3 : 1$ (d) $1 : 3$

Q.12- If a : b : : c : d then

(a) $ab = cd$ (b) $ac = bd$ (c) $ad = bc$ (d) $\frac{a}{c} = \frac{d}{b}$

Q.13- If x : 3 : : 60 : 15 then x is equal to

(a) 10 (b) 12 (c) 15 (d) 20

Q.14- The relationship between two or more proportions is called

(a) Direct Proportion (b) Inverse Proportion

(c) Simple Proportion (d) Compound Proportions

Q.15- In a factory, the Proportion between workers and the Production is

(a) Direct (b) Inverse (c) Compound (d) Complex

Q.16- The proportion between workers and days to complete a work is

(a) Direct (b) Inverse (c) Compound (d) Simple

Q.17- 8 Workers complete a work in 5 days then 4 workers will complete it in

(a) 10 Days (b) 12 Days (c) 14 Days (d) 15 Days

Q.18- Ahmad saves 15 % of his income his expenditure is _________ of income.

(a) 75% (b) 80% (c) 85% (d) 905%

Q.19- Lowest form of 7.5 : 9.5 is

(a) $15 : 17$ (b) $15 : 19$ (c) $19 : 15$ (d) $17 : 15$

MODEL CLASS TEST

Time : 40 mins Max Marks : 25

Q.1- Encircle the correct answer.

(i) $\frac{7}{5}$ is equal to

(a) 14% (b) 60% (c) 120% (d) 140%

(ii) Out of 40 students in a class 30 are Presents. The absent students are

(a) 10% (b) 20% (c) 25% (d) 30%

(iii) A team won 62% matches, ended 26% matches in a draw. The team lost matches

(a) 12% (b) 10% (c) 16% (d) 20%

(iv) The ratio of 8 rupees each to 72 rupees per dozen is

(a) 4 : 3 (b) 3 : 4 (c) 8 : 5 (d) 1 : 9

(v) One angle of a triangle is 60° The ratio of this angle to the sum of other two angles is

(a) 1 : 6 (b) 1 : 4 (c) 1 : 3 (d) 1 : 2

(vi) The relationship between two or more Proportions is known as

(a) Direct Proportion (b) Indirect Proportion

(c) Inverse Proportion (d) Compound Proportion

(vii) If $20 : 50 :: 8 : x$ Then

(a) $x = 10$ (b) $x = 20$ (c) $x = 30$ (d) $x = 40$

Q.2- Attempt any 5 short questions from the following.

(i) A table costs Rs. 720. It is sold for Rs. 920. What Percentage of profit is earned?

(ii) Define "Antecedent and Consequent" in a ratio.

(iii) In what ratio $60m^2$ be decreased to $24m^2$?

(iv) A rectangle has length of $6cm$ and width of $4cm$. A second rectangle has area of $18m^2$. Find the ratio of

between their areas.

(v) Define direct and inverse Proportions?

(vi) A journey takes 5 hours at the speed of $45km/h$. At what speed the journey be completed in 3 hours.

(vii) The price of 15 suits is Rs. 6750. How many such suits can be purchased by an amount of Rs. 4050 ?

Q.3- Attempt any two of the following (4×2)

(i) 8 Persons can do a job in 24 days

If 4 more persons joined them, how many days will they take to complete the same job?

(ii) Azeem spends 25% of his income on house rent, 60% of the remaining on house hold expenditures. If he saves Rs. 2100, what is his total income?

(iii) Rs. 4000 are sufficient for a family of 4 members for 40 days. For how many days Rs. 15000 will be sufficient for a family of 5 members.